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The Value of pH to the Filter Plant Operator

At Plants Where Alum Is Used as a Coagulant

Simplicity of the Test—Determining the Optimum—Alum as a Coagulant—Advantages of a Large Size Floc—Value of the Test.

By S. F. ALLING

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IT is not the purpose of the writer to dwell on the somewhat complicated reactions involved in water purification, but merely to relay to the filter plant operators upon whose vigilance quite frequently depends the quality of the manufactured product, the importance and simplicity of pH control. It is regrettable to state that many filter plants, and municipal plants are included, are operating with no means of control whatever excepting the observance periodically of a sample of the filtrate in a glass or other receptacle. There seems to exist an unfortunate belief among operators and mill men that if the water is clear in appearance it is suitable for use in the plant, when actually a crystal clear water may be far more deleterious than the highly colored, turbid, unfiltered water would have been had it been used directly from the source without passage through the water purification system.

The pH test is very easily made, using either the colorimetric or the potentiometer type of apparatus. The cost of apparatus for making these tests ranges from $12.50 to several hundred dollars, and the total time taken in making the test is never more than two minutes. It will not be necessary to linger on the advantages and disadvantages of the two respective types of control apparatus. It will suffice to state that both are being used with equal success and in many instances by laymen in numerous filter plants throughout the country. The pH test is conducted on a sample of the filtered water immediately after filtration and before entering the clear well or the distribution system leading to the mill. Should there be a sedimentation or reaction basin prior to the sand filtration the pH test may be conducted on samples of water taken from various points in this basin provided sufficient time has elapsed for the reaction between the alum used as the coagulant and the alkaline salts present in the raw water.

A neutral water carries a pH of 7.0, which means that there are the same number of hydrogen and hydroxyl ions present in the water. Usually it is desirable to keep the pH of the filtered water at this value of 7.0, although a filtered water pH variation of 6.8 to 7.2 is considered sufficiently close to the 7.0 pH point. However, the maximum precipitation of sulphate of alumina practically always takes place at a pH considerably below the neutral point. Every water has a pH point at which the maximum precipitation of the sulphate of alumina takes place and this point has been experimentally determined and found to be between a pH of 5.5 and 7.0. This point within the range where maximum precipitation of the sulphate of alumina takes place is known as the optimum point, and when operating at the optimum pH we obtain the characteristic large size heavy flucculent precipitate of hydrate of alumina in the minimum time.

As the optimum point approaches the 7.0 value the corrosive properties of the water decrease. However, this condition rarely occurs in practice, and it is necessary that a plant be operated at the point where good coagulation is obtained. It is then possible to add alkali to the filtered water, bringing the pH up to the neutral point 7.0, thereby preventing corrosion of the distributing main.

Since the degree of hydrolysis or the reaction of the alum with the alkaline salts present in the water depends upon the acidity or alkalinity of the water, it is necessary to have some quick method or test for determining daily the acidity or alkalinity of the water. The pH test presents itself as being most applicable. Outside of the range for maximum precipitation of the sulphate of alumina little hydrolysis of the alum takes place and the water is subsequently very often unsalable. It is the function of the pH test to keep within this narrow range of acidity and thereby insure a plant of not only crystal clear water, but water also of the proper degree of acidity

Alum as a Coagulant

A filter plant operator is continuously dealing with reactions of a reversible nature and he must, therefore,

adjust his chemical additions very often daily to keep within the range of the pH. The pH optimum point for every water may be determined by adding various quantities of alum or alum and alkali if necessary to a quantity of the raw water, stirring for a short time and by carefully observing the hydrate of alumina floc formation. The pH of the sample of water showing the best coagulation and precipitation in the minimum time is the optimum pH. Having once determined this pH optimum the filtered water pH may be kept at this point.

When alum (sulphate of alumina) is being used as a coagulant there are two general methods for increasing the efficiency of the aluminum hydroxide formation, namely:

1. By increasing the total quantity of alum added provided there is sufficient alkalinity to hydrolyze it until we reach the optimum pH point which will be within the range of 5.5 and 7.0.

In this method, however, we might possibly add up to 8 grains of alum for every gallon of water treated equivalent to 1,144 pounds for every million gallons of water filtered, in order to coagulate and settle the suspended matter and oxidize and combine with the coloring matter present in the water. While this floc formation will be excellent, the expenditure for alum will be a tremendous item in the maintenance of the plant. A reduction in alum would raise the pH beyond the proper range for good coagulation, precipitation, and so forth, of the alum and the quality of the filtered water would doubtless make it unusable.

2. The pH of the raw water may be varied by either acid or alkali additions, keeping the alum constant and low. The pH of the raw water is first varied until it is slightly above the optimum. Then a small quantity of alum is used. The amount of alum used in this method obviously is very small as compared to the first outlined method. Often one or two grains per gallon suffices, although the character of the raw water determines this quantity of alum. However, it is seldom necessary to add more than 4 grains per gallon of alum even with our highly colored surface waters. By this method we can always work at the pH point which we have experimentally found to be the optimum for efficient operation, be assured of excellent water, and keep the cost of chemicals at a minimum. It is well to note that acid or alkali is cheaper than alum.

Advantages of a Large Size Floc

The second method, that of varying the pH by acid or alkali and then adding one, two or three grains per gallon of sulphate of alumina, is the more efficient and economical one. The alum will then, by virtue of its reaction with the natural or artificial alkaline salts present, hydrolyze rapidly, forming the familiar large size heavy floc of hydrate of alumina. Quite frequently the pH is correct to start with and any adjustment with acid or alkali is not necessary. When this is the case, alum alone will bring the pH down to the optimum. Very often at different times of the year it may be necessary to add small quantities of alkali while at other times small quantities of acid may be necessary to bring the pH to the optimum point. By means of the pH test changes in the raw water may be easily and quickly noted, and the necessary chemicals applied or dispensed with accordingly.

Now let us see some of the advantages of a large size, quickly formed alum floc.

In the gravity filter system equipped with a settling basin, the presence of a large size floc of hydrate of alumina reduces the load on the filters, insures better reaction with the coloring matter present in the water and minimizes the quantity of alum used. In the pressure type filter system where there is little time of reaction the large size floc is easily retained by the sand grains, the color removal is improved and excellent clarification is effected by the minimum application of chemicals. In both cases the quantity of wash water is reduced to a minimum. Only pH control can consistently insure the operator of the attainments of these important advantages.

The pH test provides an indicator of free alum. Where precipitation of the alum takes place at the optimum pH point and the filter is periodically washed by means of a uniformly distributed wash water at a rate of at least nine gallons per square foot per minute with the addition of air wash or raking arrangement where necessary, there can be no hydrate of alumina present in the filtered water. Hydrate of alumina is the insoluble flocculent precipitate formed by the inter-action between the sulphate of alumina and the alkaline salts present in the water. Sulphate of alumina or free alum which is soluble to a large extent in water is never desirable in the filtered water since it is not only highly corrosive but is also extremely harmful to various industrial processes.

The pH test, besides serving as a control on chemical additions, the character of the aluminum hydrate floc formation, etc., will show instantaneously whether or not there is any sulphate of alumina, the dreaded free alum, in the filtered water. With a pH above 5.0 it is impossible to have any free alum present in the filtered water. Hence, when a pH test of less than 5.0, or we might say 5.2, allowing a small safety factor, is made, the operator understands at once that he is either adding too much acid or alum or too little alkali, and he at once changes the chemical additions to bring his pH back to the optimum point.

In conclusion, the pH method of control by the filter plant operators at plants where alum is used as a coagulant, has produced most gratifying results. The effluent has been consistently kept not only at the highest degree of clarity but also at the proper degree of acidity, uniform results being obtained consistently throughout the year. In addition, maximum economy in chemicals, wash water and plant maintenance is effected in a manner which can be obtained by no other method of control.

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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SEVENTH ANNUAL MEETING

Returning to New York five years after its first annual meeting in that city—the second in the Association's history—members of the American Association of Textile Chemist and Colorists convened in the Hotel Pennsylvania on the evening of December 2 for their Seventh Annual Meeting.

For this meeting a program had been carefully planned that, it was hoped, would surpass in liveliness, interest and value all previous programs. The Open Forum idea had met with such gratifying response at the past two annual meetings that it again formed a prominent feature of this year's program. About two hundred members crowded the forum room Friday evening to hear several interesting discussions on topics that had been suggested by members.

Prof. L. A. Olney, presiding at the Forum session, opened a discussion on "What Constitutes an Adequate Education for a Textile Chemist and Colorist?" He was followed by Dr. R. E. Rose, of E. I. du Pont de Nemours & Co., who enlarged on this subject and called for further opinions from the floor. A paper on "Rayon Processing," delivered by Robert P. Morningstar, led to a discussion by some of those present on "What Are the Present Difficulties Encountered in Processing Rayon?" A lively discussion on vat colors was opened by Ormand Clark, Benjamin Verity, Alfred Lustig and others. This was followed by numerous expressions of opinion from the floor on "Ways and Means of Bringing Textile Manufacturers to a Fuller Appreciation of the Value of Technically Trained Personnel in Processing Departments." When the session adjourned at 10.30 p. m., the members gathered to renew old friendships and make new acquaintances.

The morning Technical Session opened promptly on Saturday at 9.30 a. m. and had hardly got under way before increasing attendance made adjournment to larger quarters necessary. The papers presented and discussed at this session were:

"Work Done to Increase Resistance of Rayon to Water"—Dr. John E. Jackson, Consulting Engineer, New York City.

"Dip Dyeing Hosiery"—Louis S. Zisman, Gotham Silk Hosiery Company.

"Kieropon, New Process for Bleaching Colored Stripe Cotton Material"—A. R. Thompson, Jr., Rohm & Haas Company.

"Methods of Handling Cotton and Rayon Piece Goods in a Dyeing and Finishing Department"—John F. Warner, Pacific Mills, Lawrence, Mass.

"Detergents for Wool—Relation of pH to Detergent Efficiency"—Prof. Charles E. Mullin, Clemson College, S. C.

At the business meeting held before adjournment for luncheon, nominations for officers were announced by the chairman, and when the ballots were counted the committee announced the following as elected: President, Dr. E. H. Killheffer; Vice-Presidents, Walter S. Williams and Dr. Joseph F. X. Harold; Councilors for two years, Ralph F. Culver and B. F. Phetteplace. Walter E. Hadley was re-elected Secretary and Winthrop C. Durfee treasurer. In retiring from the presidency, an office which he has ably filled since the organization of the Association, Professor Olney paid a brief tribute to the whole-hearted assistance he had received from the members while in office in his efforts to advance the work of the Association.

A report of the Sub-Committee on Light Fastness, presented by W. H. Cady, and reports of other committees concluded the morning session.

The luncheon served in the hotel at 1 o'clock on Saturday was attended by 175 members and guests. The afternoon Technical Session attracted an even larger audience than the morning meeting, and the many excellent papers delivered and discussed at length made this one of the most stimulating gatherings of its kind ever held by the Association. The following papers were delivered at the afternoon session:

"The Ever-Changing Textile Problems of the Dry Cleaner"—Lloyd E. Jackson, Senior Industrial Fellow, Mellon Institute.

"Color Evaluation by Spectro Metric Methods"—Dr. Carl Draves, E. I. Du Pont de Nemours & Co.

"A Method for Measuring the Color of Textiles"—W. D. Appel, U. S. Bureau of Standards.

"Washroom Practice in the Power Laundry and Its Relation to Dyed Fabrics"—George H. Johnson, Director of Research, Mellon Institute of Industrial Research.

"Mechanical Dispersion and the Colloid Mill"—P. M. Travis, President Travis Colloid Research Company, Inc.

It is estimated that fully 500 attended one or the other of the two technical sessions, which means that the Seventh Annual Meeting was the largest in the Association's history. The presentation of the papers and their discussion smoothly followed the time order designated in the program, which thus proved to be an important innovation in the planning of these meetings.

It was the freely expressed opinion of many members that in attendance and interest, in its comprehensive technical programs, in its full discussion and review of recent advances in textile chemistry and coloring, and in every other feature, the Seventh Annual Meeting set a new high mark.

The Seventh Annual Dinner, held in a ballroom of the Hotel Pennsylvania on Saturday evening, December 3, was attended by 350 members and guests, and was distinguished by an exceptionally good program of speakers, whose addresses are given in full below.

[NOTE—*The Proceedings of the Open Forum and of the Saturday morning and afternoon technical sessions, which had to be more carefully edited, will appear in full in the next two issues of the Proceedings.*]

SEVENTH ANNUAL DINNER

December 3, 1927

The Annual Dinner of the American Association of Textile Chemists and Colorists convened in the Southeast Ballroom of the Hotel Pennsylvania, P. J. Wood presiding as toastmaster.

Toastmaster Wood—Four years ago at the meeting in Providence, R. I., I had the privilege of occupying this exalted but somewhat terrible position.

I must confess that when Dr. Killheffer rang me up and told me I was to be the toastmaster of this banquet, it gave me somewhat of a twist.

The Seventh Annual Meeting has passed into history. Our Association has not only endured during these seven years, but it has slowly and surely progressed. I think we may say that this is at once the most successful and the most populous meeting that we have ever held, and it behooves me to pay a slight tribute in my poor way to one man to whom I think we owe more than to any other member of the Association. Through his unselfish devotion to the interests of our organization he has brought us up to our present place in the world. He has given time and energy without stint. Nothing has been too troublesome for him. I know that only too well, having been a member of the Research Committee for a good many years; and, in fact, I am also one of the charter members of the organization. I should like this gentleman to talk to you. I refer to our good old friend Dr. Olney.

. . . The members arose and applauded.

Address by Dr. Louis A. Olney

They say it is a peculiar thing about flattery: the less you deserve it the more you like it. (Laughter.) I am afraid, as I sat here, I was almost beginning to like it, and I am afraid that saying must be true, because no one knows better than I that I do not deserve such flattery. What has been accomplished has been more through the loyalty of the officers and members than it has been through anything that I have done myself.

With to-night's banquet we are bringing to a close the sixth year of our Association. From a group of less than twenty men who had faith in its possibilities, it has grown during this period to a membership of one thousand, with six flourishing local sections. I am convinced that its constant growth, as well as its accomplishments, has demonstrated without any doubt the desirability and value of such an organization; and, furthermore, I am inclined to believe that an association of the character of ours will be of even greater value during the years to come.

One of the functions of our Association which I believe should and can be made of inestimable value is the work of our Research Committee. With the executive work of the Association in the hands of our newly elected and esteemed President, I hope to devote far more time during the coming year to the work of this committee, and it is especially in regard to this activity of the Association that I wish to speak at this time.

The most important work before the Committee is the continuation of our study of standard methods of dye testing, with the object of perfecting and completing them so that they may be as practicable and workable as possible. Much experimental laboratory work remains to be done before this can be accomplished.

International Standards of Fastness

In my report this morning I referred to the progress that is being made toward the establishment of international standards both as to methods of dye testing and a uniform system of recording such fastness. We are committed to undertake such work as may be necessary to make a comparative study of the methods and standards that have and will be proposed by the various foreign committees with which we have been in correspondence for some time. There is more work of an experimental nature to be done by our Sub-Committees on Light Fastness and Fastness to Washing, and we also have tentative plans for actually producing in sufficient quantity for the use of those interested standard dyed fabrics which shall correspond to the different classes of fastness described in our methods.

Furthermore, there are many problems involving the fundamental principles of textile chemistry and dye application which could very properly be studied under the direction of our Committee.

It requires no great amount of imagination to see that such a program will demand a number of full-time workers and involve considerable expense one way and another. Thanks to the returns from the few corporate members which we have so far secured and the substantial support from the National Association of Wool Manufacturers, and also the generous subscriptions from a number of our active members, we have been able to make a creditable start in this direction.

Since last June we have had in our employ a full-time research associate, William C. Smith, who has been located at the Bureau of Standards, and who has been doing excellent work, particularly in connection with our light fastness investigation. In the near future we will need additional research associates, and as soon as funds at hand will permit, a full-time Associate Director of Research. To support an adequate program of the type I have outlined at least $20,000 a year will be required. Could I read your minds I am sure I would find most of you asking the question, "How are we to raise such an amount?" I will tell you. There are in the United States no less than 10,000 concerns interested in some phase of the manufacture of textile materials, and if we add to this a number of large organizations interested in the distribution of textiles the number is greatly increased.

The Contributions of Foreign Research

We doubt if many of these American textile manufacturers realize the extent to which they are constantly using processes and materials which are the result of long and extensive research work conducted, for the most part, in Europe. The mercerizing process, the Schreiner finish, the various types of artificial silk, and a very large proportion of the coal-tar dyes are striking examples of a few of the contributions that foreign research has provided for the use of American textile interests. Should this situation be more thoroughly appreciated by individual textile manufacturers, we believe that their sense of justice will lead them to support a purely American research project along the avenue of textile chemistry and dye application, as soon as they are shown that it is already actively functioning and not merely a visionary proposal as yet only in the paper-and-ink stage.

We can never hope to interest all of these concerns to the extent of becoming corporate members, but if we can interest 5 per cent of them we will have the necessary funds. We are hoping that our active members will be our greatest asset in securing these corporation members, and quite recently a special letter and descriptive circular was forwarded to each member, and this may be looked upon as an initial move in our effort to secure corporation members. In order that this endeavor may be systematically organized and carried through to a successful conclusion, we are appointing a special committee which will have this

in charge, and I am very pleased to announce at this time that our friend P. J. Wood, who has always been a loyal supporter of our Association, has agreed to act as Chairman of that Finance Committee. That Committee will have this matter in charge, and the personnel of the Committee will be announced in the near future.

Furthermore, we believe that the textile manufacturer might be convinced that scientific research well planned and supervised might lead to just as valuable developments in the future as it has in the past.

A Way to Serve

Let me mention one way in which I believe our Association may be able to render a definite service to the textile industry. During the past few years, but more particularly during the last two, there has been a constantly increasing demand by the buying public, and as a result also on the part of the merchandise distributing agencies, for faster colors, particularly as concerns light and washing.

The advocation of the use of faster dyes has become almost a slogan with certain of the popular type of domestic science and household economics publications, and not infrequently does it crop out in certain types of advertising publicity.

Better business organizations, and even governmental interests, are looking into the matter, and various organizations affiliated with the textile industry are beginning to take notice.

As a result there has developed a situation which at the best is somewhat chaotic, and should the demands of overzealous extremists, based for the most part upon a lack of exact knowledge as regards economic conditions, manufacturing limitations and essential requirements, be given too much weight, they might react as an injustice or even an actual detriment to the textile manufacturing interests.

It would therefore seem desirable that there should be some organization, the personnel of which was conversant with the scientific facts of the textile manufacturing and the textile coloring industries, to which such matters could be referred for a decision that would be equitable to both manufacturer and consumer. We believe that such a body exists in the Research Committee of our Association.

With these facts in mind, in closing my few remarks, I wish to appeal to the active members of our Association for their support of our Research Committee, both with constructive suggestions and with criticisms whenever they may feel that they are necessary or deserved. But above all, I would ask you at this time to support our Finance Committee in any endeavor that they may make to secure funds to carry on this work.

I may be visionary to a certain extent with regard to the possibilities of what can be accomplished by our Association through the Research Committee, but without vision I think few things are accomplished, and even if we cannot attain 100 per cent of this vision, I think we will accomplish something. But in order to do that, as I have already stated, a certain amount of financial support must be received.

The various members of the Association were very loyal in supporting the work at the beginning. They felt that they were doing this perhaps more or less temporarily until the organization got "going" and had demonstrated that it was worthwhile. We hope that we have demonstrated by this time that we are worthwhile, and that being the case, we look forward to increasing financial support through these corporation members.

In retiring to-day from the office of president, which I have held since the beginning of the organization, I told Dr. Killheffer that I felt the Association was in excellent hands, and I am going to ask you all at this time to give him the same loyal support in every way that you have given me in the past.

Thank you. (Applause.)

Toastmaster Wood—There is one other man in this organization to whom I think we owe a great debt, and that man is "Fritz" Howes and his "Dyestuff Reporter." He, through his publication, has given us a great deal of much-needed publicity, and I think it has been due to his efforts in that direction that we have attained the size that we have at this time. I think we certainly owe him a debt of gratitude. I am going to ask him to stand up so that we can give him a little bit of applause. (Applause.)

I have a very lively remembrance of the instructive and amusing talk which was given to us, I think, five years ago in this hotel, on a similar occasion, by the gentleman who is to speak to us now. During a conversation with him this evening he happened to tell me that five generations of his forebears were Bostonians, and four generations of them were Congregational ministers. I told him we wouldn't hold anything against him on either count. (Laughter.) I must say that he does look a bit like a Congregationalist minister, but he tells me he doesn't feel like one.

Gentlemen, I give you Dr. Parsons. (Applause.)

Address of Dr. Frank Alvah Parsons

Mr. Chairman, Guests, and Friends: Your generous and not too noisy applause reminds me of Chicago. (Laughter.) I apologize for comparing you with so recently expurgated and so pure a place. (Laughter.) It was this way: Five years ago the Advertising Clubs of the West invited me to be their guest and talk to them, and while I was waiting in the Blackstone Hotel for a man to fetch me there (I say Blackstone Hotel, because

five years ago that was the place where people went) (laughter), a woman touched me—on the arm—and said, "Aren't you the same Parsons who talked to our club four or five years ago?"

I said, "So far as I know, the same one." (Laughter.)

She said, "Do you know you made a hit?"

"No," said I, "did I?"

She said, "You did. I hope you are going to speak to us while you are here."

"No, no," I said. "I made a hit. I never go back."

She looked me up and down and said, "Perhaps you are right." (Laughter.)

I leave myself in your hands.

The world seems to be talking more about war than anything. Had you noticed it? If it isn't Roumania, it is Albania. It is isn't Albania, it is somewhere else. I have noticed for the last ten years that the whole world seems to be arraying itself into camps, on this side and on this side, each against the other. It doesn't matter what field it is in, it is strange how universal that is. The ones over here call themselves Fundamentalists. The ones over here call themselves Modernists. It doesn't matter, does it, whether it is in religion, or biology—God forbid that I should know anything about chemistry. (Laughter.) But in every field I know about there are those who are Fundamentalists and those who are Modernists.

These over here, I take it, have accepted what has been not only in fact, but in truth, and in method, and in result, and comfortably have folded their arms and ossified. These over here, not having any gray matter active, having some other things missing (laughter), have let themselves go, and it has been some "go," and they have gotten away with murder, and called it Modernism, in any field.

Four Qualities

Still, I am pleased to think that there is a third group that has been sort of pulled out of each of these (or that has never gone over to either), with four qualities which I want to submit to you. You belong in this group I am going to describe.

First, there are people still alive with active gray matter. There are those here, of course, who have it active only on one side, that is, the chemistry side, for there are really at least two sides to us. There is always this side of facts. My heavens, how much research you talked about, how many facts you have talked about, and how these days have worn on with pleadings for more and more technicality, for more and more science, for more and more getting away from the human! However, there is still a human side, and that side is a side I want to bring out just a little bit later, but it has a connection with this group of people whom I am describing and who, I say, have as a fundamental basis gray matter still active. When I say that, I mean that the call over on this side can communicate with one on this side. There hasn't been a stoppage.

The second quality that this group has is horse-sense. Is there a place in the world more difficult to use it, even if we have it, than the city in which we live? Was there ever a time in the history of the world when it was more difficult to use it than it is now, because everything in the world now is gotten ready for us, isn't it?

I just heard, for the first time, about synthetic silk. I hadn't heard about that before. Everything I saw that shined, I supposed was silk. However, to-day there are synthetic products of all kinds, with the exception of synthetic babies—and I suppose that will come, and then we will be ruined. (Laughter.)

Friends, I appeal to you for a group of thinking men who retain their horse-sense and are not carried too far away by any one line of thinking or reasoning.

Third, there are people with imagination. There are people with no imagination, but a group of people like the group I am thinking of has imagination and can see beyond the facts. Is that risky to say here? Facts are essential. So are feelings, even if you have to drink hair oil to get a sensation. (Laughter.)

The fourth quality that I am think about is a sense of humor. Mark Twain said a good thing (at least one good thing). Said he, "Faith, hope and charity, now abideth these three, but the greatest of these is a sense of humor." (Laughter.) And it is so.

Gentlemen, if this group of men that I have described to you has active gray matter in every field within the possibility of life, and at the same time has the other three qualities of which I have spoken, we are in the midst of a movement (whether it has to do with dyeing silks, washing them, coloring them, ironing them, or what not) that is destined not only for success in the time in which we live, but success for everybody who comes after us.

It happens that there is a new slogan in life. I wonder if you have heard it. There are other organizations besides the textile organization. There are organizations that use your products. There are the wholesalers. There are the retailers. There is the benighted public. (Laughter.) All of these are using your products.

Just a short time ago, in this very hotel, the wholesalers' organization of this great country met, and a man stood on this very platform and said (and he comes from one of the largest department stores in the country and I think one of the most forward-looking ones), "Gentlemen, the time has come when we must have a national slogan in our organization and I propose this: 'Taste is a commercial asset.'"

The jaws went down, the bodies bent up, the Funda-

mentalists blinked, the Modernists looked surprised, and they adopted a slogan that good taste has a commercial value. In other words, that night a child was born (its name was Art), in the consciousness of one of the most benighted gatherings that ever came together (laughter), because they saw that there was money in it. (Laughter.) If there is money in it for the retailer, there certainly is money in it for the dyer, the silk manufacturer, or for anyone else who has anything to offer the public.

"Conditions Change—"

In considering any question, we must think of the people who figure in it first, and then of the aims—what are they after?—of those people. Then we think of the processes, do we not, and the conditions that we work in, to gain our ends.

Friends, conditions change. You are not what you were this afternoon. You will not be the same to-morrow morning. The next time you have a banquet of this sort, you will have changed some more. Conditions will have changed. Your ideals will have grown somewhat into the ideals of your retiring President—if he hasn't asked for too much money. (Laughter.) And you will find that you must modify and I must modify every day to meet conditions, to keep up with the times. But I wonder if I might suggest to you that man fundamentally is always the same, that the only difficulty is in knowing what "fundamentally" means.

First, man has and always will have his physical appetites. He always has had an appearance of a spiritual sense. It grows less and less apparent. (Laughter.) He always has had the making of an intellectual being. But he also has always had an esthetic sense.

There isn't a man in this room who has given the value to the esthetic sense that is due it. Now that the retail trade has appealed to the esthetic sense, may I ask you to consider whether or not it is essential that you in your organization give at the present time a little thought to the esthetic side of dyeing—a little more thought, perhaps I had better say, than has been given to it?

First, the esthetic sense asks for beauty—that is what they call it. That doesn't mean silk stockings, nor fur coats, nor fine automobiles necessarily. It means a harmonious relationship in things, in any field. It demands as its satisfaction what is known as harmony, or beauty. It always did.

Do you know that the eye and the ear and touch are practically the only ways that your mind and mine get in touch with the outside world? Sixty-five per cent of all that goes into my mind comes through the eye. Since the eye sees nothing but color, what in the world could be so important as color? Scientifically we know that in a normal man sixty-five per cent of what he knows comes through his eyes. If his environment is so made that he lives in the harmony of color, think what will be accomplished towards taming the wild ones, towards making Americans perfect humans, even in Europe (laughter), towards doing other things that we want to do, as well as make money.

The sermon is over.

Am I not right when I say that there are men who don't know when or where to wear a red necktie? (Laughter.) Isn't it strange that there are plenty of old women who don't know what the age limit is for pink? (Laughter.) Isn't it marvelous that people will furnish their summer cottages in red and purple and orange and expect their daughters to grow up virgins? (Laughter.) Isn't it astounding that people don't know anything about color, and they know every damn thing there is to know about chemistry? (Laughter.)

The Potency of Color

Friends, in all the history of the world there never was a better time to promote the idea of acquiring a knowledge of what color is, what it is all about, how to make it make money, and how to make it do its work in the world. When Mr. Howes annoyed my secretary by insisting that I speak to you to-night, the one thought I had in mind was, I wonder if I dare, in the face of having been successful there once, mention that fact in a great organization like this, where you are going to control whether the color fades or not—and, of course, you are never going to fix it so it won't fade; it wouldn't be to your interest, and you won't do it. (Laughter.) You are going to let it fade whenever it will, in the end. You may research to the day of your death, but you will go on doing that. Maybe you will go on making colors that would kill an animal on sight, if it had the slightest conception of what they mean, and animals often do. You might shake that color (referring to a light pink) at a bull for the next ten years and he would never move, but if you shook that one at him (referring to a bright red) you would find out pretty soon what he would do to you. But you can shake that (referring to the red) at most people in a small room, any amount of it, and they would be so immune to what that color means that they wouldn't blink an eyelash. (Laughter.)

If there ever comes a time when human beings know what color is about, it will talk, won't it? But you will be so far committed to chemistry then that it won't make any difference. (Laughter.)

That is why I spoke about Fundamentalists, to begin with. I am not for them, because if we are too absolutely certain that we know what fundamentals are, and if we are too much committed to one line even

of fundamentals, we can never get out of life what it is due every man to get out of life—a knowledge that what he has done is as big as it can be done; and when I say "big as it can be done," I mean that it is all-inclusive, instead of beating on one tack a lifetime.

May I beg you gentlemen to allow to come into your great organization the knowledge, first of all, that man, besides being a physical animal, is an intellectual being, and you represent an intellectual side of man? May we not at the same time grasp the thought that he is also an esthetic being—and a man need not be a damn fool because he knows a beautiful thing when he sees it. (Laughter.) That is the point I want to bear on just a little bit. There was a time when it was thought if a man knew what was decent-looking—unless it was a woman (laughter)—he ought to be hung. Perhaps he should have been; but he would have had so much company outside of his class, there wouldn't have been gallows enough. It isn't, gentlemen, that we don't want to know, but we don't know.

May we then, as an organization, buck up a bit to the fact that Henry Ford (and the Lord knows he is the last man you thought of, isn't he?) sounded a keynote when he said (and all your newspapers told you this to-day), "I have decided that the time has come when mass production means beauty—for the public will have beauty in line and color and form"—even in the flivver.

Thank you. (Applause.)

Toastmaster Wood—Ever since the time that I was a small child I have known the name of Cheney Brothers. I happen to have a relative who was employed by them over forty years ago, so the name is very familiar to me. As a matter of fact, the name "Cheney Silks" is a household word in America, and is well known in Europe.

It is with great pleasure that I introduce Frank D. Cheney, of this concern with a world-wide reputation. Mr. Cheney! (Applause.)

Address of Frank D. Cheney

Mr. Toastmaster, Guests, and Members of Our Association: It is a real pleasure to meet with this group of chemists and colorists, because the first work I ever did in my life for pay was in a dyehouse where I worked ten hours a day. It is interesting to meet you also, because I approached the ranks of chemistry through a somewhat unusual course. While those of you who have taken your degrees were arriving at them through the honest method of studying books and passing examinations, I sneaked in the back door and began by reading the examination papers that others had written.

It was my pleasure and privilege some years ago to read many of the essays which were written in a prize essay contest upon various subjects relating to chemistry; and while some of those essays were remarkably thought out and prepared, I found, in some, some strange and marvelous knowledge which I should like to share with you. For instance, one young enthusiast was discussing chemistry with relation to agriculture, and particularly with reference to dairying; and after describing the marvelous things that chemistry had done for agriculture and for dairying, with a really fine burst of enthusiasm this young man finished up with the statement that, "so wonderful have become the achievements of the chemists that now they can produce milk without the intervention of the cow." (Laughter.)

Another young man who was discussing chemistry with relation to the metal industries said that in building the Krupp guns in Germany, the 16-inch guns, they first used molar and then they used molecular, and they found they got better results with the latter than they did with the former. (Laughter.)

One other young man who was discussing chemistry with relation to bacteria ended up his paper by saying that "not only has the chemist accomplished great things, but bacteria is also entitled to some consideration." (Laughter.)

So you see that I am not wholly without knowledge upon the subject of chemistry, from this experience, although as a rule when chemistry is being discussed I feel a good deal like the man who wears a monocle so that he won't see at any one time more than he understands. (Laughter.)

A Fascinating Work

It is a real pleasure to be with you gentlemen, because I feel that I should like to tell you what a great job you have, and I refer to both chemists and colorists.

There is absolutely no end to the opportunity for originality, for industry, for imagination. There is something fascinating about working out a dye problem, and I always think in this connection of the chemist and the dyer, or the chemist and the printer, working together; for that is the way it must be, if it is to be a successful hitch-up. There is fascination in pursuing the various experiments and investigations—the many discouragements, the repeated efforts, and then the final occasional or frequent success. It is a great job, and it is a job which is contributing to the textile industry something of infinite value.

I suppose that if you were to gather together the textile chemists of the country twenty years ago you could have probably seated them all at this table. If

anyone doubts that let him just look around this room. There isn't an old man in the room.

That shows that this is a new industry; I mean, a new profession. Although the profession of dyeing is somewhat over 4,000 years old, the profession of textile chemistry is certainly not much over thirty years old, and now the two are going hand in hand. They are gradually, one by one, solving these difficult and intricate problems which are being presented to them, which constantly contribute to the interest of the job and to the value of the contribution which the profession makes to the industry.

It has been my fortunate lot to be very closely associated with both chemists and dyers for a long period of years. I think I have gotten more fun out of that association than out of almost any other part of my work. I find those men always alert, always interested. They are keen. They are not watching the clock. They always have something new to think about, because problems which seem almost insoluble at times are being pushed at them just a little bit faster than they can be solved.

Just think, for example, what this brand-new (brand-new, as we measure time) fiber known as rayon has presented to the dyer and the chemist in the way of problems for his solution.

It is a perfectly enormous field. It has been full of discouragements and difficulties; but that is what makes the job so interesting. If the job were easy; if it could be solved by the ordinary talent, probably there wouldn't be this gathering of you men here to-night, because it wouldn't need men of exceptional abilities to solve the problems.

Something has been said of the importance of developing new lines—I don't mean new lines so much as better lines—of washable and sun-resisting dyes, and their application. That is something of the most tremendous importance which is before all of us. We must first procure from the dyestuff manufacturer dyes which are capable of being made fast to the various agencies, and then we must learn their application not only upon cotton and wool but also upon rayon, silk, mohair, linen, and all combinations of those fibers.

There is one feature of the chemist's and dyer's work which also adds a little interest to it, for me. One of the speakers to-night mentioned the humanities in life and the necessity of having a sense of humor. This work brings you in closer contact with the people who work in the factories, in such a way that it is possible to get under their skin a little more than one can do in enormous big weave sheds, where there is the constant clatter and noise of the flying shuttles. In those associations little humorous things occur which sort of flavor the day.

As I talk there comes to mind a few of the little incidents which have made the day pass. There is always, of course, the fellow who is sent around to get a pail of dry steam. (Laughter.)

I remember one day a man came to me and asked for a raise in pay. I found that he was getting the regular rate that ruled for work of the character he was doing, and I told him so. He said, "Oh, yes, I have no complaint about my pay; but, you see, I want to get a divorce, and they cost a pile of money." (Laughter.)

Then I remember another day going into the finishing room and seeing a man there standing next to a dry can which had collapsed because the vacuum valve had failed to work. He was very much excited. He said, "My god, Frank, it is a good thing that vacuum didn't come back, because if it had it would have killed the man who stood beside it." (Laughter.)

Born in War Time

You have all assisted in the birth of a new industry in this country, which is far from being the least important thing that you have done. Many of you will remember in the early days of the war the feverish running about and buying of dyestuffs. We discovered then that we did not have a dye industry in this country. We had a few assembling plants, but we did not really have a dye industry, and our American manufacturers very soon began to make efforts to produce such an industry, and you helped them immensely in those efforts.

That is one of the outstanding industrial accomplishments of our time: the speed with which that industry was developed and the excellence of the product which it turns out for us to use. And, as I say, you textile chemists and colorists stood loyally behind that growing industry, and I doubt very much if it could have succeeded without your help, without your resourcefulness, and your interest.

You did that as a patriotic act, in part, and in part there was some self-interest in it, but the net result is that you have contributed to this most valuable national asset, which is a safeguard to us not only in time of peace but in time of stress, should such a time ever come again.

That dyestuff industry is under a certain obligation to you, as a result of your efforts. It is under an obligation to give to you the best that it is capable of giving, and in return for that "best," I know that you will continue to give that industry the support you have given it heretofore, so that it may maintain its American independence.

I was very much interested a few days ago to read

the Year Book of your Association and to learn of the amount of research work which is being done by your Association, to note the number of meetings which have been held in the various sections, and the interesting subjects which you have discussed. Those meetings must be most stimulating to all who attend them. I am sure that they must contribute tremendously to the value and the effectiveness of your Association, and I look forward to the future of this Association with confidence that it will increase in its usefulness.

In closing, I wish to pay to the textile chemists and colorists of America my most sincere tribute for their accomplishments so far, and also to express my complete confidence in their greater progress in the years to come. (Applause.)

Toastmaster Wood—For the benefit of those who don't know it, I want to say right here and now that I am a citizen of Paterson, New Jersey (applause and cheers), and I'm proud of it. This last week we have been having what we call Achievement Week. We have been exhibiting everything made there, and a great deal of interest has been displayed, but the thing most interesting to me was the slogan we adopted, and that was, "Say a Good Word for Paterson Everywhere You Go"—and I am doing it.

Voice—How about Passaic?

Toastmaster Wood—Passaic is a large suburb of Paterson. (Laughter.)

Paterson, as many of you know and all of you should know, is the largest silk-producing city in the world. I have lived there twenty years, and it is a good place in which to live. I think many of our honored guests will be glad to know, if they don't know it already, that it was founded by a New Yorker—Alexander Hamilton.

Saying a good word for Paterson reminds me of the story of the real estate salesman in Western Texas who was showing a piece of property to a prospect, and he remarked to him, after expatiating on the value of the particular property he was showing him, "Why, all that Western Texas needs is a few good people, and water."

"Huh," said the prospect, "that's all that Hell needs." (Laughter.)

Paterson has both good people and good water, and the water is particularly good for silk dyeing. That is why we have ninety per cent of the silk-dyeing industry of the United States right in the city of Paterson.

Five years ago I had the privilege of introducing the mayor of an Eastern city, and at that time I took unto myself the privilege of nominating him as a candidate for United States Senator, and when I heard that the mayor of New York was coming to-night I was wondering what office I would nominate him for. But history relates that the gentleman whom I nominated failed of election, so I thought perhaps I had better keep my hands off in this case.

Unfortunately, His Honor, the Mayor, was unable to be with us but he sent a telegram which I shall read to you:

"I sincerely regret being compelled to forego the pleasure of addressing the Association of Textile Chemists to-morrow evening, as circumstances have arisen which make it necessary for me to go out of town over the week-end. Please convey my greetings and very best wishes for a pleasant evening to all those who attend. Colonel Metz will deliver my address."

(Laughter and applause.)

Address of Colonel H. A. Metz

Mr. Chairman and Gentlemen: The Toastmaster certainly has a way of reading things that aren't there. In other words, he has imagination, which one speaker talked about here. The Mayor didn't say that in the telegram, but he did tell me that yesterday. He called me up, first, and said, "I must get out of town, Herman. Do you blame me?"

I said, "Not if you have a chance to get away. I don't blame you a bit, Jimmy."

He said, "I will send you a telegram. Make amends for me and tell them I hope I will have another chance to speak to them some time."

I have represented the Mayor on various occasions, and it is always a pleasure to do so, because he is a pretty popular Jimmy. He does everything but work in the City Hall. (Laughter.) But we have a good city to work in, just as good as Paterson in some ways. We haven't so much water. We have some fire-water, I noticed, around here. (Laughter.)

I am really sorry the Mayor couldn't come. He has a very charming personality and most everyone he comes in contact with likes him. Whether we like him well enough to re-elect him, I don't know. I hope so. I am a Democrat. (Laughter.) That doesn't mean much in these days.

However, I am glad of an opportunity to say just a word on this occasion. Someone here made a remark about all the men in this room being young men. From the standpoint of years, I suppose I am the oldest man connected with the dyestuff industry in this room.

But I was very much impressed with what Mr. Cheney said. I remember forty years ago going to South Manchester. James Cheney, at that time, was looking after the dyestuff end of the business and I never left there without an order. (Laughter and applause.) I always stopped there as a last resort, going through Connecticut. If I got nothing else, I would go in to see James Cheney and I would come back with an order.

I have had the good fortune of seeing the development

of the dyestuff business, and I know the value of the research chemist and the textile chemist. I remember when they were very scarce, when very few plants had a chemist or a colorist. There has been a marvelous growth and development along this line, and as Mr. Cheney said, it isn't just the business that makes it so interesting; it is the developments and the new things that have come in that have made it so interesting. It has certainly been a most interesting line, and it is becoming more so every day. The thing is becoming more and more complicated and you young men will have the pleasure of going through with it. It is worthwhile, and any work that is worthwhile is enjoyment, and any kind of work that is enjoyment is a good thing to keep at.

I have been in it long enough to see these developments that have come to pass. We have mentioned some of the men who did much to build up the business in this country, and to establish it on a firm basis, because this business has come to stay.

I want to say that one of the men who did much for this industry is Frank Garvan, and I am glad to say that I heard a few days ago that after being in bed for almost a year, he is now able to get around again. I know you will all be glad to hear that. We have had our fights personally, but I have never once doubted his sincerity of purpose, and I am therefore glad to tell you men who are interested to know that Frank Garvan is getting better and that he is up again.

In paying tribute to those who have done things for industry, we must remember him. We may not agree with him entirely, but we cannot deny that his object has always been sincere, and I am very glad to pay this tribute to him, and I thank you for the opportunity of doing so. (Applause.)

Toastmaster Wood—I think Colonel Metz is one of the most modest men I ever knew. He said just now that when he went to Cheney Brothers he never came away without an order. I have been told that he never came from any place without taking an order.

Anyone who needs an introduction to the next speaker must be deaf, dumb and blind—especially dumb. Next to Doctor Olney, I think he has done more for the success of this organization than any other one man that I can think of. He was instrumental in getting me to enter as a charter member in the beginning, in the slow birth of this organization, and I believe I am correct in saying that he organized four-fifths of the different sections. I know he was responsible for organizing the Southern Section, the Piedmont Section, and the New York Section—those I am quite sure of. I am not quite so sure about the Philadelphia Section. I refer to our good friend, and present President, Dr. Killheffer. (Applause.)

Address of Dr. E. H Killheffer

Mr. Toastmaster, and Gentlemen: I am accustomed to plenty of competition in business, but in public speaking I am afraid that I must take a back seat, because I can't try to compete with some of the speakers that you have already listened to. In other words, I am not suffering from any hallucination that I am by any chance an orator.

I want to tell you briefly that I do not lack appreciation of this high honor that you have seen fit to bestow on me. I have tried to do my little part as we went along, building this Association, and I do appreciate this mark of your esteem very highly indeed and will try to be worthy of it during the year that I hope to serve you.

There was some question as to whether I would stand for election. There were two reasons for that doubt. One was that I didn't know whether I would have the time. The other was I wasn't entirely sure that it was the wise thing to do. But you will notice that, having decided to stand for election, I made very sure that there was no opposition candidate. (Laughter.)

Building—it might be building anything—happens to be something that I am very fond of. Therefore, in the work of building, which we have largely devoted our efforts to so far in this Association, I have been very, very much interested. It seems to me that our problem now is, How shall we best continue to build, and how shall we build best?

In order for our Association to continue to grow as it has grown, it seems to me we must have a very firm purpose in mind all the while. We have had such a purpose so far, evidenced perhaps more in the way of the work of our Research Committee than in any other one way. Certainly the work that the Research Committee has attempted is a very important one, and they have during these years accomplished a very great deal. I don't believe that their real accomplishments can possibly be known as the present time, because, after all, the work that they have done up to the present has been more or less in the way of laying a foundation for a substantial permanent structure which it is hoped will be built.

Financing Research

Professor Olney mentioned how this work might be financed, and I should just like to leave this one thought with you, using as an illustration an industry about which I know more perhaps than some others, and that is the dyestuff industry: The dyestuff industry in the United States regards as a regular and permanent part of their budget an amount of money,

devoted totally to research, which is equivalent to between 3½ and 4 per cent of their total sales volume. They realize that that must be so if they are to go ahead. That has been so up to the present, even though their research has been along the line of producing many colors which, while new to us here, were not new to someone somewhere else. There will probably be an even greater percentage of expenditure when more really pure research is attempted.

If you will consider for one moment the sales value of the products of the great textile industry which we serve, you will get some idea, by comparing it with this smaller dyestuff industry, of what a very small percentage of the sales volume would do in the way of research. If we were to devote one-tenth of 1 per cent of the sales volume of the cotton, wool and silk industries to a research fund, we would have about two and three-quarter million dollars in a year. Of course, nobody dreams that we can do that; but just the same, that percentage is a mighty small figure; and if any such sum of money, or a very small fraction of it, were devoted to systematic research, the textile industry undoubtedly would profit proportionately from that expenditure.

To bring the lesson home a little closer in the way we would like to apply it, if some fractional part of that small tax could be raised or could be contributed to this Association by any means that we might select—and the means we have selected which seems to be the simplest is the provision for corporate memberships—we could go forward with the research which we would like to do. All of the work that this Association has done in the way of research is for the benefit of the textile industry, not for the benefit of the individuals who did the work. The work has all been voluntary, and voluntary by employees, not by the employers; in other words, the people who stand to profit principally as a result of that work. It seems to me that we, all of us, have something to sell to the textile industry of the United States: to become corporate members of this Association, and in that way contribute to our research fund an amount that will be infinitesimal to each textile firm, but which, in the aggregate, will provide a sum many times in excess of the $20,000 a year that is now thought necessary to at least make a beginning in the work that is visualized.

Collective Effort Valuable

Furthermore, we all get from the Association in direct proportion to what we contribute to it. We can all bring things in and discuss them in our various sectional meetings. Many times a paper is presented by someone else on the very subject that perhaps you or I have been thinking about for some time, and on which we have perhaps done a considerable amount of work. Collective effort is the valuable thing to the Association, its membership, and to the textile industry.

Before concluding, I have what to me is a very pleasant task to perform.

Some people with whom we work over a period of time we grow to respect in very large measure. Others with whom we are in contact we not only grow to respect, but there gradually grows a very strong affection for them, which continues from day to day and constantly increases. That feeling, I am sure, is the feeling of this whole Association toward our past President and dear friend, Dr. Olney. While it was realized that it would be very difficult to show in any really tangible way the affection in which we hold him, it was thought that at this time we should like to give Dr. Olney some small token of our esteem and our appreciation for the very hard work that he has done for this Association during the past six years. It is therefore my great privilege to present in the name of this Association to you, Dr. Olney, this watch, which, while it is not yet engraved, we propose to have marked with this inscription:

"Presented to Dr. Louis Atwell Olney by his fellow members in The American Association of Textile Chemists and Colorists, on the occasion of his retirement from the Presidency thereof, in grateful appreciation of his services to the Association—December 3, 1927."

. . . The members arose and applauded.

Professor Olney—As I see all you gentlemen, my fellow members, arise and applaud, there suddenly comes back to me an experience of my college days. We had a professor of German—"Dutchy" Ringer, he was called. He was a man well toward seventy years of age. One morning it was reported that his family had been increased by a son, and at his first class the next morning the boys gave him quite an ovation. When they had quieted down, he said, "Boys, why make all this fuss? Any one of you could have done the same thing yourself."

I feel that way about the work I have done for the Association. There isn't a member on the Council or connected with the Association who could not have done exactly the same thing that I did.

But no words that I could utter at this time could possibly express my great appreciation, Dr. Killheffer, of this token which has been presented to me. All I can say is that I thank you all from the bottom of my heart, and I shall remember this as long as I live. (Applause.)

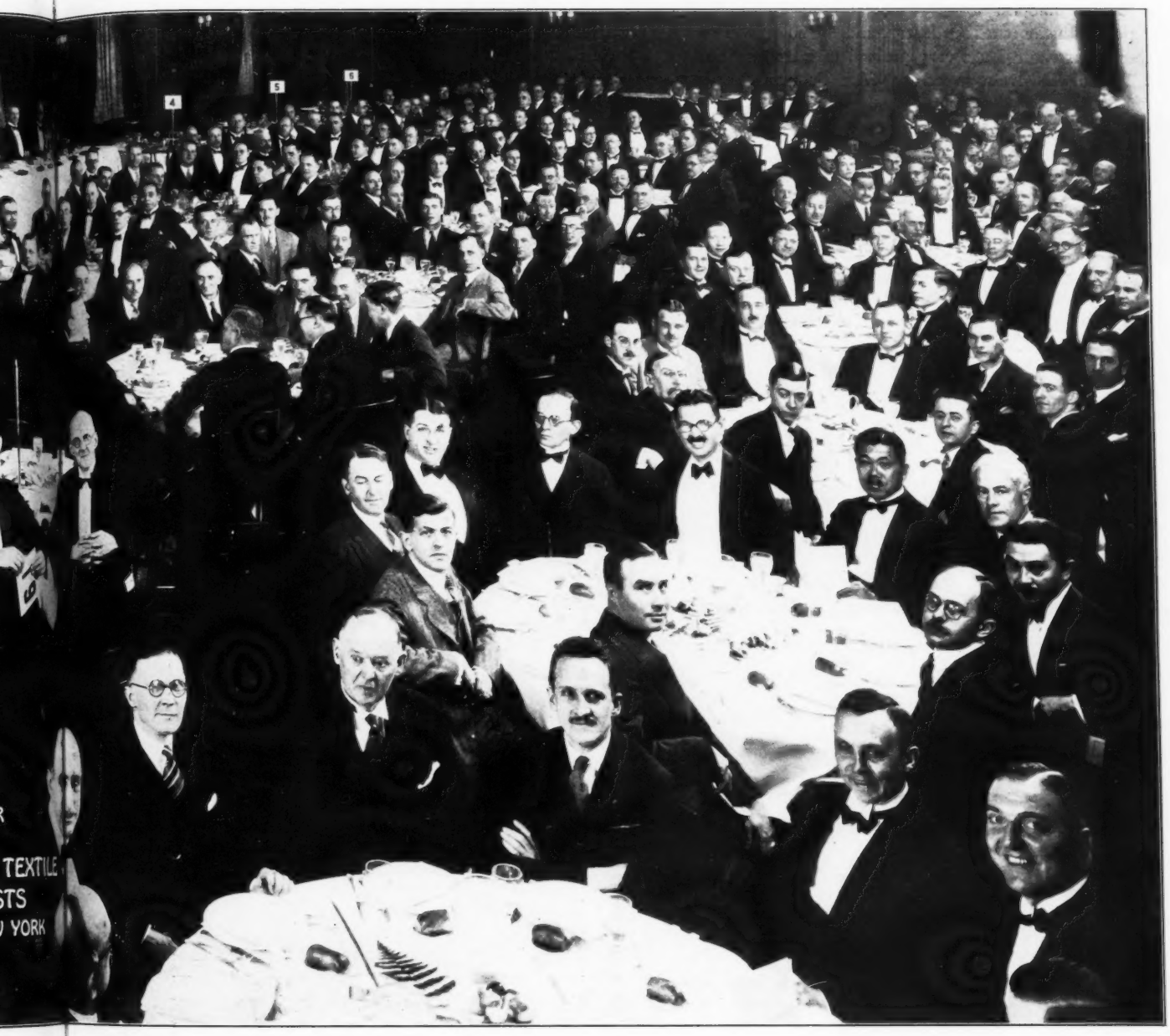
. . . The dinner closed with a humorous address by Dr. D. W. Daniel, of Clemson College, S. C.

OCTOBER MEETING OF THE NORTHERN NEW ENGLAND SECTION

The Northern New England Section of the American Association of Textile Chemists and Colorists convened for its regular October meeting on the evening of October 22. When the ordinary business of the Section had been completed, the chief speaker of the evening, Selden Hall, was introduced by the chairman. He presented an extremely interesting paper on "Wool Scouring," which was followed by a lively discussion. Both the paper and a report of the discussion follow herewith.

Dr. L. A. Olney opened the session with the following remarks:

Dr. Olney—I think many of the members of the Section know that Winthrop C. Durfee, Treasurer of the Association, was suddenly taken ill early in the summer. Mr. Durfee is a member of this Section and has always been one of its loyal supporters, and I think it would be



very pleasing to him if he should receive a letter from the Secretary expressing our best wishes for his hasty recovery. (A motion to this effect was duly made, seconded and carried.)

Chairman Leitch—It is announced that your Executive Committee has decided to hold your next meeting in January. We are skipping December, which would be the regular month, on account of the annual meeting of the Association, and we will probably run meetings a little closer together later in the winter to make up for it. We have several lecturers in view and expect very good subjects.

To-night we are going to hear something which ought to prove of great interest to the woolen people, and there may be some way of applying the principle shown in this process to other processes in the textile industry. We are very glad to have with us one of the men from the De Laval Separator Company, a man who has gone very

thoroughly into the matter of centrifugal force in connection with the textile industry, and, of course, in many other industries. I am very pleased to introduce Selden Hall, who will give a paper on "Wool Scouring."

Wool Scouring

By Selden Hall

Wool, as it comes from the sheep, is contaminated with potash, soda and other salts carried from the sheep's body by sweat and left in the wool as the moisture evaporated. It also contains from 3 to 30 per cent of grease from the same source and much dirt from the ground on which the sheep have lain.

The object of scouring is to remove from the wool all of the dirt and salts and a large part of the grease. This must be done with a minimum breakage of fiber, and in a way that will leave the wool in such a condition that there will be a minimum breakage in subsequent operations.

Many of you are familiar with the methods that are now used in scouring wool and know that there have been no noteworthy changes in the process for many years. Each superintendent of a wool scouring plant has had his own ideas and has made slight variations in temperature and in proportion of soap, soda ash, caustic soda, etc., but the process is substantially the same in all plants.

As there may be a few here who are not familiar with the present process, I will give a short description of the apparatus and its use.

A Complete Wool Scouring Outfit

Briefly a wool scouring outfit consists of a picker for breaking the wool up into small tufts, four or more wash bowls with rakes to stir the wool in and carry it through them, wringers to prevent carry over of water from one bowl to the next and a dryer at the end.

The water in the first bowls of the string contains chemicals that loosen the dirt, etc., from the wool, and the latter ones contain clean water to rinse out the chemicals. By the word chemicals I intend to include *all* materials added to the water to loosen dirt and grease from the wool. Usually when the scouring is started in the morning the bowls have all been filled with clean water, and to each has been added any chemicals needed in it. The solution in the several bowls vary, as I said before, with the ideas of different men. One way of working is with, in the first bowl, a solution containing soda ash or potash and occasionally a neutral soap or one containing a little soda; in the second bowl, water to rinse out the chemicals carried from the first by the wool; then a special soap in the third bowl and a final rinse in the last bowl. Sometimes, in order to have less dirt in the liquor that contains the wool grease, such a string of four bowls is preceded by one in which dirt is washed out by water alone at a temperature too low to start the grease. Wool is scoured with these solutions until, in the judgment of the operator, the water is too dirty to wash more. They then dump the dirty liquor, make up new solutions and start over again. This may occur once a day or several

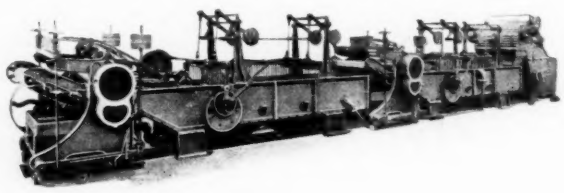


Fig. 1

times a day, depending on the condition of the wool being scoured and the quality of product desired.

With this manner of operation, the first wool scoured by a batch of solutions receives too harsh a treatment and is apt to be brittle and, when carded, make a poorer quality of product, while the last scoured before the dirty solutions are dumped may not be as thoroughly cleaned as is desirable.

About ten years ago my attention was called to this process and particularly to the removal from the wash water, or liquor, as it is generally called, of the wool grease which at that time brought a high price. The price of wool grease is so low to-day that in some cases the money received for it will not pay for the cost of recovery, but the authorities in some States are taking drastic action against stream pollution. The removal of grease is one of the first steps in prevention of pollution, and it is the only step in the process that can return any of the money spent on it.

A Study of Scouring and Its Objects

The De Laval Separator Company, with whom I have been connected for over seventeen years, have built many centrifugal machines for this purpose, and one of my duties has been improvements in these machines. My study of the problem has, until quite recently, had three objects in view:

A—Recovery of a maximum quantity of grease.

B—Recovery of the grease in a condition of maximum cleanness, etc.

C—The longest possible run between stoppages of the machines for removal of dirt collected in them. I have tried so to design the separating bowls that the liquor passing through

them would sludge out with it a maximum part of the solid dirt.

During these years we have paid no attention to the methods or chemicals used in the scouring process.

In some other lines of work our efforts have been toward purifying the liquid in a body or in a stream rather than the recovery of materials from the stream. In purifying lubricating oil we used to, after the oil had been used till it was considerably contaminated, draw it all out of the system, clean it and return it to the system. In dry-cleaning plants we used to take the gasoline that had been used till too dirty to wash more clothes and purify it ready for further use. With this batch system of cleaning the percentage of dirt in the fluid varied from almost nothing to the maximum allowable. This condition is shown by the triangles on the accompanying curve Fig. 2), and is similar to the condition that exists in most wool scouring plants to-day.

Our modern process in lubricating oil systems and in dry-cleaning plants is simply this: From the point in the apparatus where the liquid is dirtiest, i. e., the oil sump in a steam turbine or Diesel engine or the bottom of the washing machine in a dry-cleaning plant, to take a stream of dirty liquid, purify it and return it to the system at some other point. With this purpose the liquid never has a chance to become very dirty. The condition is more as shown by the straight line on the curve. We have called this the "continuous purification" process, and it is now universally known by this name.

While the continuous process of cleaning wool wash liquor has been proposed several times, the large quantity of dirt known to be in it discouraged people before they started. We were also concerned more with the recovery of the greatest quantity of clean grease with a minimum of trouble and were giving thought to recovering

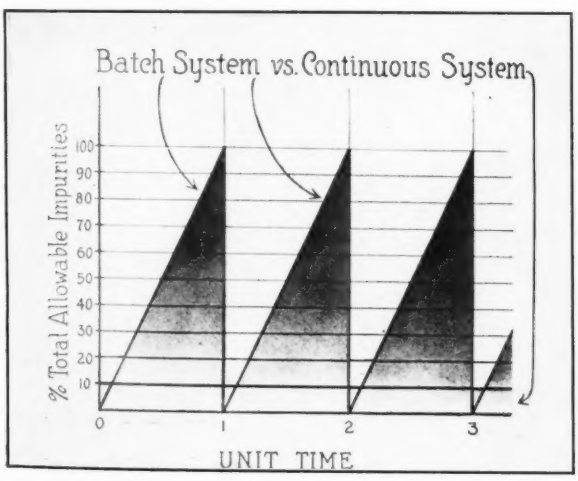


FIG. 2

the large quantity of grease that we know was being wasted and reducing the labor of removing dirt from the bowls by causing as much as possible to pass through them and be carried off with the liquor.

Those of you who have been around many wool grease recovery plants know that they are generally wet, dirty, smelly places, often with floors so dirty and wet that they have gratings for the men to walk on or the men wear shoes with inch-thick wooden soles, and with so much foul steam in the air that if a person spends ten minutes in the room with his street clothes on he will be shunned in the street cars and busses for the next twenty-four hours. This condition is not necessary. I know of one plant where the floor in the wool grease recovery room is as clean as in other rooms in the plant, and the quantity of escaping steam is so very small that one small exhaust fan could stop it entirely. I have on several occasions visited this plant and spent half an hour or an hour in the room without the necessity of changing any of my clothes or even my shoes after leaving.

DIFFICULTY OF REMOVING DIRT

As I have hinted before, one of the great troubles in recovery of wool grease was in the frequent stoppage of the centrifuges for removal of solid dirt. From the earliest days it has been standard practice to provide large tanks in which the liquor was held for from twelve to twenty-four hours to allow as much as possible of the dirt to settle out of the liquor before it was fed to the centrifugal separators. As early as 1918 the North Star Chemical Company, of Lawrence, Mass., experimented with large relatively slow centrifuges to take out more of this dirt but soon stopped their use. The trouble was not with the idea of removing dirt in that way but with the machine they had then available for it. When the previously mentioned clean plant was designed, the Tolhurst Machine Company, of Troy, built some special centrifuges (Fig. 3) for this purpose, and a special device was built for handling the baskets while cleaning them. These successfully removed a large part of the dirt and so permitted longer runs of the higher speed De Laval centrifugal separators. The picture (Fig. 4) shows their outfit diagrammatically.

The scouring bowls on the main floor were all provided with drains to large settling tanks in the basement where the liquor was held for twelve to twenty-four hours to let the coarser dirt settle out and supposedly a large part of the grease rise into the upper part of the liquor. From these tanks the liquor was taken by swinging skimming pipes and passed through Tolhurst continuous centrifugal dirt extractors to a sump with a float for controlling the flow. A pump in a pit near the sump raised the liquor to an elevated heating tank from which

the liquor flowed by gravity to the De Laval separators, where the grease was removed, and then to the sewer. Before the skimming pipes got too close to the dirt in the bottom of each settling tank the flow was shut off and the dirt and remaining liquor were discharged to the sewer. It has since been found that an unsuspectedly large quantity of grease was lost in that way.

I wish again to call attention to the fact that efforts for improvements had all been directed toward greater recovery of grease, better quality of grease and longer

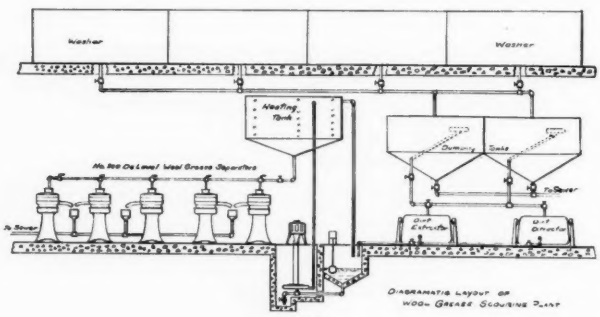


FIG. 3

runs between cleanings. We even changed the design of our separator bowls to embody purchasers' ideas for increasing the sludging effect.

A New Process of Wool Scouring

All that I have said so far refers to present processes and is in the nature of a preamble to that which is to follow.

During the past year a new scouring process has been tried out and put into operation. This is a process that several men in the De Laval organization had felt would be a success but had been unable to have tested.

Calculations showed that only a part of the grease removed from the wool was being recovered. There were only two possible places for loss of grease. These were in the wash liquor discharged from the separators, and in the dirt and the liquors thrown away with it without passing through the separators. Regarding the first-mentioned loss: It is known that any caustic used in the washing solution will combine with some of the grease, forming a soap which will then enter into solution in the water and hence cannot be removed centrifugally. This soap is also known to act as a binder to hold some more of the grease in an emulsion that is very difficult and in some cases impossible to separate.

It was thought that if the partially degreased washing solution could be sufficiently clarified to be re-used for washing more wool, it would soon become saturated with soap and emulsion, and further additions of grease could be separated with comparative ease. At any rate, if the same liquor was used over and over continuously and none thrown away, there would be no grease thrown away with wash liquor.

Regarding the second possible loss: Investigation disclosed that a surprisingly large quantity of grease was imprisoned in the solid dirt while it slowly settled by gravity and was thrown away with this dirt. It was believed that if this dirt could be thrown out quickly by centrifugal force, the grease would be left in the liquor and could then be recovered.

The experiment was tried by continuously drawing dirty wash liquor from one end of the first scouring bowl, centrifugally removing most of the dirt and grease, and returning it to the other end of the bowl. There were two objects in mind: first, recovery of more grease, for as long as no liquor was thrown away there would be no loss of grease with liquor; and, second, a better quality of grease by separating it within a short time after it was washed out of the wool, instead of after staying twelve to twenty-four hours in contact with the putrefying wash liquor. The centrifugal dirt extractors were depended on to remove most of the solid dirt.

The drawing (Fig. 5) now on the screen shows diagrammatically the apparatus and method of operation for the first experiments with the continuous process. The scouring bowl held about 3,000 gallons, the liquor settling tanks about 7,500 gallons each and the liquor storage tank about 6,000 gallons. Liquor drawn from the scouring bowl flowed through the settling tanks where some of the heaviest dirt settled out; then through a heater which, you will note, preceded instead of followed the dirt extractors; then through the dirt extractors into a sump, from which it was pumped to the De Laval centrifugal grease separators and liquor clarifiers, which not only take out grease but most of the fine dirt not taken out by the dirt extrac-

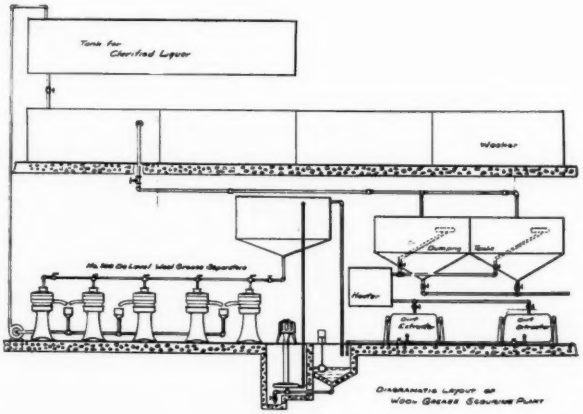


FIG. 4

tors. The liquor is then pumped up into the storage tank and, flowing back into the scouring machines, starts around again.

With the liquor heaters before instead of after the dirt extractors, the dirt separates out more completely and the De Laval separators run at a capacity of about 600 gallons per hour each, from about eight in the morning till about three in the afternoon, without

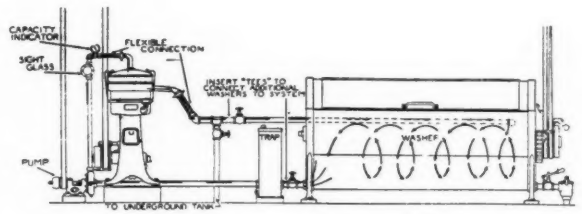


FIG. 5

cleaning. This makes a total of about 3,000 gallons per hour, so that the entire content of the scouring bowl was treated every hour.

Comparison of the previous slide with the one now on the screen will show that this is essentially the process that we have been using for years in dry-cleaning establishments.

You may think that they were trying to scour with dirty liquor, but you are mistaken. It has been found here, as in the dry-cleaning industry, that the efficiency of removal of dirt is very high. The liquor recirculating for a long time is not as dirty as at the end of the first two hours with the batch process.

THE PROCESS IN DETAIL

You understand that the objects sought were still the same three points: (a) maximum recovery of grease; (b) maximum quality of grease; and (c) long runs between cleanings of machines.

Beginning at about three o'clock in the afternoon, they would shut down, clean and start again, one after another, all of the five De Laval machines and the two Tolhurst dirt extractors, so that at five o'clock they all had only a small quantity of dirt in them. At that time the scouring stopped for the day, but clarifying and separating continued. When the liquor was all out of the scouring bowl, the dirt which had collected below the grating was shoveled out and the bowl was cleaned and filled with clarified liquor from the overhead storage tank. The liquor was then drawn out of the settling tanks and the settled dirt was shoveled or pumped out of them ready for the next day. When this day's work was completed, consequently, all of the liquor had been degreased and clarified and was back either in the scouring bowl or in the clarified liquor storage tank.

The first thing noticed after starting the continuous process—which was installed in hope of getting more and better grease—was a tremendous increase in quantity of grease recovered. The next was the saving in heat required, because the hot liquor was returned to the scouring bowl instead of being thrown away and replaced by new liquor made up from cold water.

They soon found that the quantity of soap required was reduced ultimately from three barrels per day in this particular plant to two barrels per day, which was a saving of $40 or $50 per day in operating cost.

They also found that the quantities required of other chemicals, soda, potash, caustic, etc., were rapidly reduced, until after a few weeks of operation literally none was required. In fact, they found that the potash and other salts that had collected in the wool from the sheep's sweat made, when dissolved in water, the best solution for scouring the wool and they required no other chemicals. This was obviously another saving in operating cost.

After the process had been in operation for a while, they found that with the heaters before instead of after the Tolhurst dirt centrifuge they worked so efficiently that the partial settling in tanks between the scouring machine and the Tolhursts could be dispensed with. It was also easier to dispose of the dirt in this way than to shovel or pump it out of the settling tanks, and in addition they recovered a considerable quantity of grease from the liquor that would have been thrown out with the dirt. However, a storage tank having a capacity equal to the scouring bowl is advisable to permit quick dumping of the bowl when necessary for shoveling out the dirt that collects in the bottom of the first scouring bowl. This tank will, however, be nearly empty at other times.

From the preceding you will observe the following advantages of the continuous process:

1. Greater quantity of grease recovered.
2. Saving of approximately one-third of the soap.
3. Saving of nearly if not all soda, caustic, etc.
4. Saving of water, which in some cases is a large item, and particularly so where the water is hard and water softeners have to be used.
5. Saving of heat; which means fuel, of course.
6. Complete elimination of stream pollution by scouring liquor without resorting to the acid cracking process that has been hertofore required in many cases.
7. The solid dirt is taken out in such a comparatively dry concentrated condition that it is easily dis-

posed of. This should doubtless have value as a fertilizer if investigated further.

The above advantages of the continuous recirculating system for wool scouring are of great importance, but all these advantages are completely overshadowed by others not yet mentioned.

Action of the Chemicals in the Process

Scouring solutions made up from commercial chemicals have an action on the wool that is described as harsh. The wool is brittle and the result is that the percentage of noils is higher than should be.

On the contrary, the scouring solution that contains principally chemicals removed from the previously scoured wool has an action that is described as soft. The wool is more flexible. The scouring can be done more rapidly. The result is uniform—that is, the same quality of wool is found in the first lot that comes through in the morning as in the last that comes through at night. Because of the greater uniformity and the greater flexibility of the fibers, the cards and combs can be run faster and require less attention.

It is now standard practice in some plants to add to scoured wool some kind of oil which, by replacing some of the wool grease washed out, softens the fibers and makes them more flexible. It seems logical to assume that there is no other grease as good for making wool soft and flexible as that prepared by nature for the purpose, and with the continuous circulation process there is always enough grease still left in the liquor to leave in the wool the desired amount required for flexibility.

Finally, and of greatest importance to all, the higher price received for the increased percentage of tops will pay so well that even if there were no market at all for grease and no savings by the process, we feel the wool scourers would find it not only advantageous but even necessary to install the continuous process as I have described it rather briefly this evening.

Method of Grease Recovery

There are some points in connection with grease recovery that should be mentioned. When the original skimming separators, as we call them, are adjusted to recover the maximum quantity of grease from the raw liquor, they are apt to take with it an appreciable amount of liquor containing some dirt. This may be 10 per cent or even more. If this dirty water remains with the grease for any great time, the quality of the grease deteriorates. Consequently, if a trough is placed where it can catch the "originally skimmed" grease from all the machines so it is immediately fed into a stream of clean hot water equal to or a little greater than the quantity of grease, it can carry the grease to a small tank (preferably with an agitator), where the grease and water can mix intimately, thereby "washing" the grease. Following this, it can be immediately fed to a "re-run" separator adjusted to give nearly anhydrous grease from one spout while the wash water is discharged from the other. The De Laval wool grease separators are provided with adjustments so that the same kind of machine can be used for re-run as is used for skimming, but in most cases one No. 600 re-run machine will wash and dehydrate the grease from several No. 900 separators.

The picture now on the screen (Fig. 6) shows an electric-motor-driven No. 900 wool grease separator with friction pulley to start it gradually, although the electric motor comes to speed almost instantly, thereby permitting the use of standard constant speed motors and standard starters.

I mentioned the fact that one of the so-called troubles in wool grease recovery is the operation of cleaning the bowls. New apparatus brought out within the past two years has reduced this work to a small item. You now see a bowl-cleaning outfit (Fig. 7) for a No. 900 De Laval industrial centrifuge. The best way to show how easily the cleaning can be done is to show a moving picture of the actual work and run

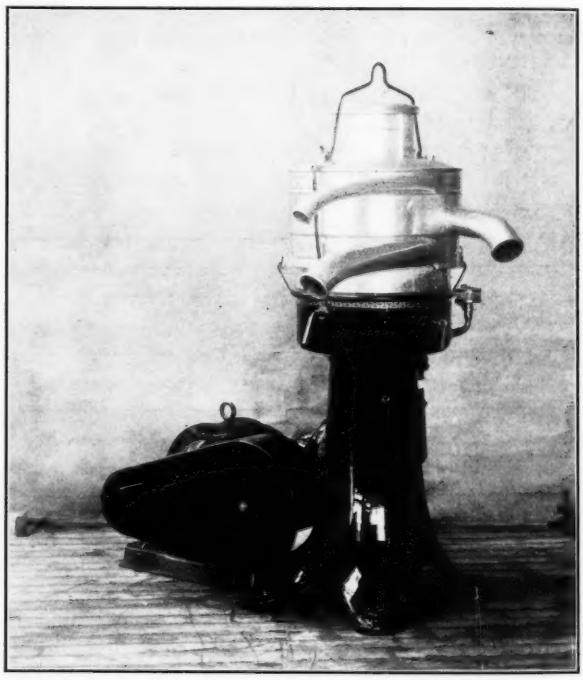


Fig. 6

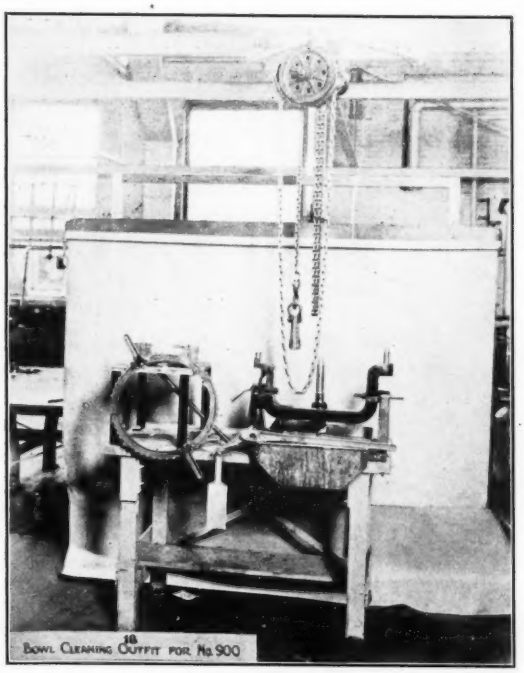


FIG. 7

at the same speed as when the picture was taken (movie). This job has been done by an expert in less than four and one-quarter minutes. It is not considered that that is a proper time in which to expect all men to do it, but it is being done regularly without haste in less than ten minutes.

I have no picture of the device for cleaning the baskets of the Tolhurst dirt extractors, but it is similar in principle to the one just shown.

Discussion

Mr. Leitch—Mr. Hall has consented to answer any questions you may ask that he is able to answer. Are there any questions?

Question—You say, Mr. Hall, that you save one-third of the soap. What becomes of the two-thirds that is not used in the first bowl, the soap that is used in the third bowl and the liquor that is not recirculated? If it is circulated in the first bowl without sending the scouring liquor to the second, the rinsing and soap liquors in the later bowls will go to the sewer. The liquor from the first bowl is the one loaded with dirt and grease and chemicals so that it is a very bad item in stream pollution.

Mr. Hall—There is no stream pollution from scouring liquor. There has been no attempt made yet to recirculate the rinsing and soap wash liquors. That is a future problem.*

Question—How much of the wool grease do you actually recover?

Mr. Hall—That varies. I have been in some plants where it is almost impossible to remove it centrifugally, in others they get almost all, under the old scouring system. In this system we get all the grease, or practically all of it that is washed out of the wool.

Question—Might I ask if this process is in practical use?

Mr. Hall—It is being used in one mill.

Question—What do you use in the first bowl?

Mr. Hall—They have reduced the amount of chemicals added to the first bowl to almost nothing, after the original start.

Question—Do you know of any mill using caustic in any bowl?

Mr. Hall—I do not.

Question—Is the wool treated at all before it goes into the picker?

Mr. Hall—Not that I know of. It does not go through any degreasing proposition; that is, in plants where I have seen it.

Question—The process would be feasible for any kinds of wool?

Mr. Hall—I should suppose so.

Question—In this mill, where the process is used, how long can they run liquors before throwing them away?

Mr. Hall—With this process they ran a number of weeks on it. The only additions to the material in the first bowl have been those for make-up. Of course, there is always a little of that liquor that is carried over in the second bowl to be rinsed out. So there is a small amount of fresh water required each time.

Question—Do I understand they use caustic soda in this process?

Dr. H. C. Chapin—Regarding the possibility of using caustic soda solutions on wool I think that in this process you might safely do things which would be unthinkable elsewhere. In degumming silk Dr. Scott found that in the presence of gum from a previous operation the silk would stand a much higher caustic soda concentration because the gum, through its buffer action, reduced the pH. As to wool, in a paper presented before this association I showed that even such an alkaline substance as borax has sufficient buffer action upon caustic soda to materially reduce its weakening effect in a given concentration upon wool. It seems to me that your re-circulated scouring liquors are much like the re-used degumming

*Author's Note—With the liquor in the first bowl kept comparatively clean all the time, there will be comparatively little carry-over, so that the dirt in the liquids from the other bowls will be a much smaller item than with the old process.

baths of Dr. Scott, probably requiring make-up of stronger alkali to offset the buffer action of substances dissolved from the wool. It is not improbable that by cutting down the weakening and roughening effect of alkali these buffers do reduce the amount of noils produced by tearing of longer fibers in card or comb.

Question—What is the cost per unit of installation of this equipment, the cost per bowl and approximate additional cost for labor, etc., to operate a unit for a year's time?

Mr. Hall—Mr. Hopper, what is the price of the No. 900 wool grease machnie?

Mr. Hopper—Motor driven? It would run around $2,200.

Question—Is that for only the machine or for a total unit?

Mr. Hopper—Just one No. 900 machine.

Question—What is the total cost of installation to take care of one scouring bowl?

Mr. Hall to Mr. Hopper—On one scouring outfit. Can you give an estimate on that?

Mr. Hopper—I can give an estimate on the equipment, but the installation depends entirely upon the plant.

Mr. Hall—About five No. 900s.

Mr. Hopper—I should imagine it would run somewhere in the neighborhood of $15,000 to $20,000, including tanks. The cost would depend on how often you would want to circulate the bowl.* If you had 3,000 gallons in your bowl so as to clean it up once an hour it would take five minutes; once in two hours half this number would be required.

Question—How many men does it take to operate the equipment?

Mr. Hopper—In this plant with five machines and two Tolhursts there are two men. Two men are busy on the equipment half a day, the rest of the time working on other things. When the machines are running, there isn't anything for the men to do.

Mr. Hall—That is from eight to three o'clock, except for occasional cleaning of dirt extractors.

Mr. Hopper—Yes, the men are busiest from three o'clock until five or six o'clock.

Question—Does this liquid become rancid or smelly?

Mr. Hopper—At the end of seven weeks it was not.

Question—Doesn't this liquor in the first bowl build up and have an excess of soluble salts?

Mr. Hall—The question that puzzled me was why it did not. The only explanation I can give is that there is enough carried away with the small amount that is carried over to the second bowl so that with the make-up the liquor does not get beyond a practical concentration.

Question—What was the percentage of water in the grease when it came from the first run? How wet was the grease?

Mr. Hall—That will run from about 3 to 10 per cent of moisture and it has in some cases gone to 20 per cent. The re-run grease is 1 per cent or less. Generally less than one-half per cent.

Question—Can you give any idea of the horse-power?

Mr. Hall—These extractors require about 3 h.p. and two men handle the entire plant of five extractors and two dirt extractors.

Question—Are the extractors all 3 h.p.?

Mr. Powers—The power used in starting the dirt extractors is 7½ h.p., and when the machine is brought up to speed the actual horse-power required is only 2¾ to 3.

Question—Then you would have 3 h.p. for each of the seven machines?

Mr. Powers—Yes. Three h.p. for each of the two dirt extractors and 3 h.p. for each of the five De Lavals.

A Question of Higher Production

Question—Every wool scouring plant I have seen used soap in the second and third bowls and water in the last, and when they cleaned bowls cleaned the whole machinery. I am looking at the proposition of cleansing only the liquor in the first bowl. In this case you would have to stop the train to cleanse the second, third and fourth bowls.

Mr. Hall—It is not so much a question of the actual time saving on the scouring process as it is the possible advantages of either a better product or a higher production than you are getting.

Question—You mean to clean the wool better?

Mr. Hall—I do not think you would find there would be much difference in the cleanliness of the wool, but you will have a higher percentage of tops than you are getting.

Question—Do you realize where they are using a solvent like naphtha that the amount of noil is just about the same as the other fellow's? I am tremendously interested if you show us how to get a better product or cheaper one, or how to save heat and labor.

Question—There is need to look at this problem from another angle than returns on cost of equipment. The State will demand that you purify streams. New Jersey people are begging for help and cannot begin to take care of the dirt. I do not like the idea of making fun of caustic. In 1889 we had an Englishman come

*Since the meeting it has been learned that the above figures are for equipment to handle the scouring liquor from three scouring trains rather than one, as was intimated at the meeting. A total of five 900 clarifiers and two Tolhurst dirt extractors are now handling the liquor from three scouring bowls at the mill where this system is installed

over from England to show us how to scour wool. He used caustic potash solution and potassium carbonate. But after he resigned I threw it out. I was afraid of it. But the man knew how to handle it and it made good yarns. It makes a person's tooth ache to think of using caustic nowadays. We want to be ready for the time when we have to purify liquors in our own little streams. We are doing pretty well, but have given up attempting to recover wool grease. In the early days you could get good money for grease. Now it costs a good deal to reclaim it, but occasionally somebody gets a good price for it. We do not want to be in the same position as Rhode Island. Every once in a while they do not purify the water fast enough there and the dirty water tank gets filled up and overflows. One plant had to pay a good deal of money in damages. I think we must look into this process from the point of view of stream pollution and get a place fit for us to live in.

Mr. Powers—Perhaps I can throw a little light on this plant cost. I am familiar with the original installation. That installation was made primarily to take care of the stream pollution. The water *had* to be pure that was dumped into that stream, so that the plant *had* to be installed. It was operated, as Mr. Hall said, for some time, the water being discharged perfectly clean, the grease recovery small but perhaps on the average, due to the fact that the centrifugal removed the dirt more efficiently than in the old settling process. It was found later on that this continuous circulation process would yield a large amount of grease. It was tried out and a change made in the location of the heaters, and not only did we get a larger yield of grease (from about three barrels a week to something between five and six barrels a day), but these other advantages were also found. We could not go into a wool scouring plant (as merely manufacturers and sellers of machines) and go to the chemist and say: "What are you doing?" It would be tactless for us to do such a thing, so we are not familiar with the washing process being used, but we have run this plant on the continuous system somewhat in excess of six months, and the management assures us that the savings being effected will pay for the total installation charge within the next two years.

Answer—Mr. Chairman, I might add that in the mill I represent, at the present time we are using the old settling process. We used to use steam driven centrifugals and operated the plant at a loss, chiefly to keep our grease out of the sewer, but by installing De Laval electric-driven machines we have succeeded in making a profit of at least 1½ cents per pound by the old settling method, and have such faith that we are now installing some more centrifugals.

Question—Your man finds it is an easy job to clean a machine in less than ten minutes?

Answer—Every day it is done in less than seven minutes.

Member—I would like to add to the story on the scouring. I know of a three-bowl plant where sodium carbonate is the only chemical used in the first bowl. The second bowl has a little soap and the third bowl has just the warm water. In another plant, the four-bowl plant, soda or sodium carbonate is used in the first bowl and soap and sodium carbonate in the second bowl and plain water in the third bowl and very little soap in the fourth bowl. That is, it is supposed to assist in the process, but the soap is very slight, however. I think in that plant also over 90 per cent of grease removed from wool comes out in the first bowl.

Answer—I think that in a continuous scouring process even if a little grease is left in the wool after coming out of the first bowl to the second before it got through the train the grease would be washed out completely. Sometimes the first bowl gets dirty and the liquor goes into the second bowl in a considerably greasy condition. I found that after it comes out of the train there will be less than ½ per cent of grease in the wool, and I think probably 3/10 is about the minimum that you can get. Leaving grease as a wool lubricant is not much of a point, as it would be washed out.

Question—In the case of a mill where stream pollution is not an important item, do you advocate a plant for the recovery of grease?

Mr. Hall—I said in many cases the money received from the grease would not pay for the operation. In some plants where they have better equipment and work in an efficient manner, we have been told they are making a profit. If everybody who is scouring wool were getting grease out, the price would get lower. My personal opinion is that in the grease recovery business the only place I have looked for the sale of machines for grease recovery is where stream pollution is a serious item. This is information given me and, as Mr. Powers said, people who have tried out this process say that it will pay for the equipment in two years, with the increase of higher quality of wool. Their saving in soap alone is reported to be $40 to $50 per day; for three hundred days this would be $12,000 to $15,000 a year.

Increase in Grease Recovery

Question—How could you account for grease recovery increased from three barrels a week to six per day?

Mr. Hall—That has been a point to which I have given considerable though and I have not reached a completely satisfactory solution. The only explanation I can give is

the theory that some of the grease is saponified and that acts as a binder. I do know that there are materials which, when put in a mixture of water with oils, will act as a binder so when they are thoroughly mixed they will stay. I had a sample of lemon oil and water on a shelf for six months. If you mix them they will separate in a very few minutes. In this case a small percentage of the white of egg was put in and emulsified, and in the course of a couple of years it separated, but it was there as an emulsion for six months. My theory as to why this grease went through was that there were things in there that acted as a binder. When the liquor is used over and over it becomes saturated and additional grease added to the mixture is easily separated out.

Mr. Hopper—In this plant we are speaking of, with the analysis of the liquor which had been left to stand, as in the settling tank, we found that the largest percentage of grease remained with the dirt, and as they let it stand it became more rancid. By taking out the dirt almost immediately before fatty acids formed they were able to keep the grease in the liquor instead of in the dirt, but once it gets carried down with the dirt you cannot touch it.

Mr. Hall—The dirt settling slowly through the liquor will carry with it quite a large percentage of grease. Compare this gravity settling with the centrifugal separation of dirt in this way. The force, for separating a particle of grease from a particle of dirt, of gravity is so very small that the surface tension of the grease will make them stay together, while if you put them under centrifugal force, the force is several hundred times that of the force of gravity and the dirt will break away from the grease, so the grease remains in the liquor. There is a surprisingly small amount of dirt in the grease, and the dirt from the centrifugal extractors carries a very much smaller quantity of grease.

Question—Why don't they distill grease in this country the way they do in England? (One man who did it could smell his own plant five miles away, he said.)

Answer—I know of several concerns that had to, by law, especially one who has brought suit for pollution of stream. I know concerns in Rhode Island where there is a perpetual injunction. Anyone taking water from a stream must return it to the stream as they found it. This company has to have every bit of acid and grease taken out. There are mills with not only one scouring train, but with thirty or forty scouring trains dumping material from each bowl four times per day. Incidentally, I have never seen any wool with 30 per cent. Some concerns using the centrifuge method are doing well if they get over 3½ per cent. A continuous cleansing proposition might well be started. There is no question about heat or soap, but there is a very serious question as to whether your remarks are sound as to the tops. Some of the mills are only noiling 10 per cent now. Some will want an explanation. It does not seem that the line on which you will have to work is noiling or tops. The Barre Wool Combing Company lose $10,000 on their grease recovery. The Thornton Mills $15,000 to $20,000 more than they get. My proposition is an inquiry as to what it is going to cost. It looks as though it is going to be terribly costly; $22,000 to $25,000 with dryer and four bowls and putting almost the same cost to take care of the 3,000 gallons in the first bowl with the addition of two more men to run the bowl, increasing the cost tremendously. You will have to find more use for this wool grease. It does not look to me as though the acid process is correct. Your process sounds correct.*

Mr. Hall—You spoke of the other bowls. The solid dirt collecting can be taken out in the centrifugal. If there is nothing that will build up solutions beyond the point where they can be used, there is no reason why the centrifugal process cannot apply to all bowls.

Cost Per Yard of Scouring

Question—In goods worth a couple of dollars a yard, what percentage of that is the wool scouring?

Prof. Barker—The cost is very low. If you want to have it done on commission and want to pay out 1½ cents to 1¾ cents you can get it. It is even done as low as one-half cent. Does that answer your question?

Question—That will be around 1 per cent for scouring?

Answer—The average shrinkage of wool is double what the ratio would be—the cost is very low. I don't think we have a Chinaman's chance on decreasing the amount of noil. It is not sound because where the wools are cleansed with ordinary soap they can compete any day in the week with those cleansed by solvents. Talk about cleansing a stream and you have something.

Mr. Hall—I gave one figure as to the amount of grease in raw wool. I said from less than three to over thirty. I met a man in 1917 or 1918 who had extract tests from wool in some cases over 30 per cent of the wool.

Question—I should like to have seen the wool; not that I doubt it, but I should like to have seen it.

Question—The pollution problem is not to be a very serious one in the future. Back in 1912 it was quite a pressing question brought up before the State Legislature and laws were passed, or were threatened to be passed, to require wool grease to be removed from the streams; but the war came and we have not heard of it since. I don't think it will come up in the future mill business as it is to-day. Prof. Barker remarked that the bowls get dirty, but with the continuous process you have practically clean water, and most of the dirt comes out in the first

*Regarding costs see previous notes.

bowl, at present, after operating for half a day, the first bowl becomes very dirty, and the second and third correspondingly dirty, but with the new process would remain very much cleaner than otherwise. If you have your washing water in the first bowl continuously purified and grease removed it would be more efficient; the grease from the second and third would be materially less and, further, I think the claim that you would get a larger proportion of grease is also correct because if the first bowl is removing all the grease and not adding more soap or other ingredients of that sort, you would remove it more efficiently with a centrifugal.

Mr. Leitch—I am sure we are all indebted to Mr. Hall for giving this paper, as there has been a lot of work and preparation. I am sure it is a step toward the solution of the problem of the pollution of streams, and in behalf of the Section I want to thank Mr. Hall for coming here to-night with his paper.

NOVEMBER MEETING OF THE PHILADELPHIA SECTION

On Friday evening, November 11, eleven members of the Philadelphia Section of the American Association of Textile Chemists and Colorists met for dinner at the City Club of Philadelphia at 6.30 p. m., where a very enjoyable time was had.

At 8.15 p. m. Chairman Wm. R. MacIntyre called the meeting proper to order with fifteen members present. As this meeting was the first of the season, 1927 to 1928, it was given over to a round table discussion of the policy and plans of meetings for the rest of the season.

As the first item of business the minutes of the April meeting were read and approved as read. There being no old business to come before the Section, the Chairman appointed a Nominating Committee to submit nominees for officers and Sectional Committee for the season. The Nominating Committee appointed were as follows: B. K. Archer, chairman, K. L. Harper and H. A. Stafford.

The Nominating Committee reported as follows: For Chairman, Elmer C. Bertolet; Treasurer, Paul A. Endriss; Secretary, Percival Theel; Sectional Committee: Dr. Charles S. Hollander, William R. MacIntyre, Lawrence A. Stead and Richard H. Brehm, Jr.

On motion duly made, seconded and passed, the report of the Nominating Committee was accepted and committee discharged with thanks. Nominees were asked for from the floor and there being none nominations were closed.

There being no opposition the Secretary was instructed to cast the ballot, and the nominees were declared elected.

The remainder of the meeting was given over to general discussion of coming meetings, etc. The meeting adjourned at 10.00 p. m.

PERCIVAL THEEL, *Secretary.*

Corrections—1927 Year Book

Owing to a misunderstanding, many of the dyestuffs formerly appearing under the name of the Grasselli Dyestuffs Corporation were inadvertently marked with a dagger in the Tabulation of American Dyes in the 1927 Year Book. These dyestuffs are still manufactured and are distributed by the General Dyestuff Corporation. Please ignore the dagger whenever prefixed to a dye designated as being sold by the General Dyestuff Corporation.

Attention is called to an error appearing in the 1927 Year Book of the Association, wherein dyestuffs manufactured by Palatine Aniline & Chemical Company are indicated as being sold through F. E. Atteaux & Co. as selling agents. This is incorrect, as F. E. Atteaux & Co. no longer represent Palatine Aniline & Chemical Company.

Applicants for Membership

Active Membership

Armour, Bernard R., executive, American Aniline Products Company, New York City, N. Y.

Brady, Frank A., superintendent, Stevens Manufacturing Company, Fall River, Mass. Sponsors: P. F. Estey and Louis Palizza.

Curtis, Raymond, chemist and dyer, Bradford Dyeing Association, Bradford, R. I. Sponsors: Eric T. Laurin and R. F. Culver.

Ernst, E. F., president, Products Trading Corporation, 2 Hudson Street, New York City, N. Y. Sponsors: Otto F. Graenicher and E. V. Patterson.

Fagnoni, Louis, chief dyer, 405 East Fourth Street, New York City, N. Y.

Howard, Jesse M., demonstrator, E. I. du Pont de Nemours Company, Charlotte, N. C. Sponsors: J. L. Dabbs and D. C. Newman.

King, Gelston T., chemical sales and research, E. and F. King & Co., Boston, Mass. Sponsors: W. S. Williams and J. H. Grady.

Lord, Wilfred A., salesman, General Dyestuff Corporation, Providence, R. I. Sponsors: Louis Palizza and P. F. Estey.

Rioles, Paul A., assistant to foreman dyer, Cooper-Kenworthy, Inc., Providence, R. I. Sponsors: Harry Ambler and F. L. Stonely.

Schulze, Emil J. C., agent, Ayer Mills, Lawrence, Mass. Sponsors: E. A. Johnson and Henry D. Grimes.

Schwenn, Paul O., salesman, General Dyestuff Corporation, Providence, R. I. Sponsors: Louis Palizza and P. F. Estey.

Smolens, H. G., chemist, Buffalo Electrochemical Company, Philadelphia, Pa. Sponsors: F. C. Walsh and E. C. Bertolet.

Junior Membership

Bannister, Robert E., chemist, Hood Rubber Company, Watertown, Mass. Sponsors: J. Worton and C. Nelson Alderman.

Kelly, Andrew J., assistant chemist, Burkart Schier Chemical Company, Chattanooga, Tenn. Sponsors: E. L. Fletcher and Wm. Kelly, Jr.

Warner, E. Thomson, student, Philadelphia Textile School, Philadelphia, Pa. Sponsors: E. C. Bertolet and P. Theel.

ASSOCIATION BADGES

The lapel button badge illustrated herewith is worn by members of the American Association of Textile Chemists and Colorists.

The three "rings" are enameled in red, yellow and blue, respectively, and the initials and border are brought out in gold. The general effect is exceedingly attractive.

Badges may be secured at $1.50 each by addressing the Secretary.

WALTER E. HADLEY,
5 Mountain Avenue,
Maplewood, N. J.

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

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CLAYTON HOAGLAND
Managing Editor

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ONE BRASS TACK

NEGOTIATIONS among the European dye and chemical trusts have reached the boresome stage of signed agreements and production statistics, markets and quotas, wound 'round with miles and miles of red tape. Those who delight in tracing through to the last dotted line all these intricacies of modern European commerce are now in their glory, while the rest of us should be seeking a path of clear reasoning that will skirt the tangle of red tape and lead to an eminence from which we may obtain a simplified view of the situation. Or, to express it in a very much overworked phrase, we must reduce the problem to its brass tacks.

Why bother with myriad details of the precise manner in which Europe's new chemical cartel is being formed? Is it of momentous importance to the American industry that Germany and France have at last formally signed an agreement at Frankfort for the cooperation of their respective chemical trusts; that arrangements covering dyestuffs are already in operation between them; that price-fixing, though denied, is believed to be closely involved in such arrangements; that markets are being sliced up among the participants not only for chemicals but also for rayon; that export quotas are being fought over and that separate negotiations are under way between the German and British trusts and the British and the French?

This much is all we need know—that Europe is gathering its forces for an intensive effort to capture a large share of the foreign trade in dyes, fertilizers and rayon, and to prevent American foreign trade from expanding; and that it is only logical our interests, both abroad and at home, should be endangered by such an attack. The final outcome of this impending trade war between an industrially united Europe and an industrially powerful America may not be certain for many months, or even for years. But there is one brass tack we can get down to—one irrefutable truth we can be sure of right now—namely: that the share of world markets this country's dye and chemical industry will eventually command, and the strength of the industry's position at home, will depend entirely on how much intelligent effort is made here during the next few months to defend our foreign markets and our position before it is too late for defense.

NEW DYESTUFF CONSOLIDATION

AN interesting consolidation of dyestuff manufacturers under the corporate title of "Chemical & Dye Corporation" is announced elsewhere in this issue. The constituent companies are The Chemical Company of America, of Springfield, N. J.; the New England Aniline Works, of Ashland, Mass., and the Tower Manufacturing Company (dyestuff department), of Newark, N. J.

It is the intention of the new corporation to merge all manufacturing operations in one plant, to be located at Springfield, N. J., as rapidly as the necessary tranportation of apparatus, etc., can be accomplished. The selling and executive offices of the new corporation will also be located at Springfield. The Chemical & Dye Corporation will continue to manufacture the various types of dyestuffs which have heretofore been produced by the three companies, and will also add to this line, as rapidly as possible, new products for which the experimental work has been already carried out. The operation of the new corporation will be under the direction of executives who have been in charge of the above-mentioned three companies in the past.

The REPORTER has repeatedly called attention in its editorial columns to the desirability—in fact, the necessity—of closer co-operation in both manufacture and selling on the part of the smaller dyestuff manufacturing concerns, if they are to have a reasonable hope of surviving under the competitive conditions which now exist in this field. Unquestionably, the present merger is a step in the right direction and constitutes an example which many other of the smaller concerns would do well to emulate.

CRAFTSMANSHIP

Craftsmanship is the crowning quality of excellence that comes only when a man enjoys his work.

The coppersmith of the Middle Ages who labored day and night, without thought of food or sleep, till he had made a perfect shield, was a real craftsman.

Craftsmanship never looks at the clock. Whether in beating a shield, painting a landscape, printing a page, or in merely polishing a bit of brass to perfection, always there is the happiness that comes from doing the work beautifully.

A bit of real craftsmanship is infinitely more than a job: it is the reflection of the soul of its maker. It says, "Who made me loved his work."—Dixon "Graphite."

CHEMICAL AND DYE CORPORATION

Three well-known dyestuff companies have announced, under date of November 29, a consolidation to be known as the Chemical and Dye Corporation. The three constituent firms are: The Chemical Company of America, Inc., Springfield, N. J.; New England Aniline Works, Ashland, Mass., and the Tower Manufacturing Company, Inc., Newark, N. J.

The main office and plant of the Chemical and Dye Corporation will be located in Springfield.

S. O. C. A. HAS INTERESTING ANNUAL MEETING

A most instructive talk on the significant factors affecting the American tariff was the principal feature of the annual meeting and luncheon of the Synthetic Organic Chemical Manufacturers' Association, held Friday, December 9, in the Hotel Commodore, New York City. The address on the tariff was made by John E. Edgerton, president of the National Association of Manufacturers, and president of the Lebanon Woolen Mills, Lebanon, Tenn.

Other speakers at the luncheon were: Dr. Charles H. Herty, adviser to the Chemical Foundation; Daniel F. Waters, president of the Germantown Dye Works, and Dr. Arthur L. Faubel, secretary of the American Tariff League. August Merz, president of the association, presided.

Mr. Edgerton spoke on the relation of the American manufacturer to the tariff question. The one outstanding accomplishment of American brains and energy, he said, is the industrial structure of the country, which we have builded with the help of the protective tariff, the open shop and the guarantee of equal rights to all men.

The great need of American manufacturers to-day is not for increased knowledge, but for a better utilization of the knowledge they already have, declared the president of the National Association of Manufacturers. It is necessary for the manufacturer to protect himself, rather than to send representatives to Washington to plead for him.

Dr. Herty and Mr. Walters, the two honorary members of the association who were present, brought greetings to the association.

Dr. Faubel spoke of the indifference of the American manufacturer to the tariff, and the need of educating the general public to the necessity of continuing the protection afforded by the tariff. At the present time many groups are actively working for a lowered tariff, and Dr. Faubel warned that in another year there would be a serious attempt to change the tariff schedule.

At the morning business session of the association August Merz was re-elected president, F. P. Summers re-elected treasurer, Dr. E. H. Killheffer elected as one of the vice-presidents, and the following re-elected as vice-presidents: Ralph E. Dorland, W. F. Harrington and P. S. Rigney. Dr. Julius Stiglitz, of the University of Chicago, was elected Honorary Member.

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i. e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

EXPERIENCED CHEMIST

American chemist, B.Sc., with twelve years' analytical, research and manufacturing experience in the dyestuff industry seeks position where ability and loyalty will be recognized. References. Address Classified Box 418, American Dyestuff Reporter.

SALESMEN WANTED

Progressive manufacturers of a complete line of textile chemicals for all trades (sulphonated oils, softeners, sizings, specialty soaps, finishes, etc) have openings for progressive salesmen in following territories: Pennsylvania, New York State, New England, Southern States. Only men with established selling connections need apply. Salary, expenses, commission. Unusual opportunity for the right parties. Apply Box 429, American Dyestuff Reporter.

EXPERIENCED BOSS DYER

Position wanted as boss dyer. Graduate of European technical schools. Two years' laboratory experience with one of America's leading dyestuff houses as textile chemist. Three years' experience as practical dyer in mill, dyeing silk, cotton and silk, rayon, Celanese and wool and silk piece goods, plain dyes and for discharge printing. Thirty years old, married, German-American; at present employed as second boss dyer. References. Address Classified Box 430, American Dyestuff Reporter.

DYER WANTED

Wanted—An experienced dyer for rayon skeins. Address Classified Box 431, American Dyestuff Reporter.

COLOR CHEMIST

Color chemist, graduate of German technical school, fifteen years' experience in Germany, Russia and United States, thoroughly acquainted with modern printing and finishing of cotton, artificial silk and wool piece goods. At present technical manager of a first class finishing plant in Germany—wants a suitable position with well organized plant in the United States. Will furnish European and American references and certificates. Address Classified Box 432, American Dyestuff Reporter.

SALESMAN

To sell throwing oils to silk mills. Must be acquainted in the trade. Splendid opportunity for the right man. Address Box 433, American Dyestuff Reporter.